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ABSTRACT

An analysis of 12,000 1982 high school graduates' transcripts, as part of a study conducted by the National Center for Education Statistics, substantiates the National Commission on Excellence in Education's (NCEE) concern about students' insufficient coursework in the new basics: English, mathematics, science, social studies, and computer science. An analysis of who earns how many credits in the new basics reveals substantial differences among subgroups defined by race/ethnicity, socioeconomic status, high school program, type of school attended, and geographical region. Analysis presented in this bulletin has three parts: (1) an examination of course distribution taken in the new basics, with a focus on number of additional credits needed by some students to meet NCEE standards; (2) a description of the number of credits earned by grade level; and (3) a comparison of credits earned among students with different backgrounds. Six tables and figures are included. (JMK)

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National Center for Education Statistics

# bulletin

U.S. DEPARTMENT OF EDUCATION

Office of the Assistant Secretary for Educational Research and Improvement

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# More Coursework in the New Basics is Needed to Meet Standards of National Commission on Excellence in Education

An analysis of the transcripts of 1982 high school graduates substantiates the concern of the National Commission on Excellence in Education (NCEE) about the insufficient coursework in the new basics: English, mathematics, science, social studies, and computer science. The NCEE also suggested that the curriculum for college-bound students should include a foreign language. Only in English and social studies did a majority of 1982 graduates meet the standards for graduation recommended by the Commission.[1] In other fields--mathematics, science, computer science, and foreign language--less than 50 percent of 1982 graduates met each of the individual standards. Although on the average students earned over 5 credits each year, average credits in the new basics ranged from only 3.6 units in the 9th grade to only 2.6 units in the 12th grade. Even students in college preparatory (academic) programs completed fewer courses in the new basics in their last year of high school than in any other year. The potential to earn more credits in the new basics exists in every grade of high school, particularly in the later years.

An analysis of who earns how many credits in the new basics reveals substantial differences among subgroups defined by race/ethnicity, socioeconomic status (SES), high school program, type of school attended, and geographical region. For example, white and Asian-American students earned more credits in the new basics than black and Hispanic students. Students with high SES backgrounds, students in academic high school programs, and students in private schools also earned more credits in the new basics than students in other categories.

These findings are based on an analysis of over 12,000 transcripts from a sample of 1982 high school graduates.[2] The transcripts were collected as part of High School and Beyond (HS&B), a national longitudinal study of high school sophomores and seniors of 1980 sponsored by the National Center for Education Statistics (NCES). Specifics about the classification of courses, the data base, and the reliability of the estimates are presented in the technical notes at the end of this bulletin.

The analysis presented in this bulletin has three parts: First, an examination of the distribution of courses taken in the new basics, with a focus on the number of additional credits needed by some students to meet NCEE standards; second, a description of the number of credits earned by grade level; and third, a comparison of credits earned among students with different backgrounds.

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[1] In its report, *A Nation at Risk*, the National Commission on Excellence in Education found that, "Secondary school curricula have been homogenized, diluted and diffused. . . ." The Commission recommended "that State and local high school graduation requirements be strengthened and that, at a minimum, all students seeking a diploma be required to lay the foundations in the Five New Basics by taking the following curriculum during their 4 years of high school: (a) 4 years of English; (b) 3 years of mathematics; (c) 3 years of science; (d) 3 years of social studies, and (e) .5 year of computer science. For college-bound students, 2 years of foreign language in high school are strongly recommended in addition to those taken earlier" (p. 24).

[2] This sample was derived from a national probability sample of the 1980 sophomores who graduated in 1982.



NCES 84-204b

**Additional credits in the new basics needed to meet NCEE standards**

In an earlier report, Owings and Brown found that only 2 percent of 1982 high school graduates met the full set of requirements recommended by the Commission.[3] A further analysis by each subject area revealed that less than 50 percent of 1982 graduates met the individual NCEE standards in mathematics, science, computer science, and foreign language. Only in English and social studies did a majority of 1982 graduates meet the standards. As shown in figure 1 and table 1, the percentage of graduates who met the standards was 65 percent for social studies, 59 percent for English, 46 percent for mathematics, 30 percent for science, and 13 percent for computer science.

Many of the students who did not meet the recommended NCEE standards would need several additional courses in each subject area. About 30 percent of the high school graduates, for example, needed 1 additional credit or less in English to meet the 4-credit standard, while 11 percent needed more than 1 credit. About 32 percent needed 1 additional credit or less in mathematics, while 21 percent needed more than 1 credit. Similarly, 36 percent needed 1 additional credit or less in science, while 34 percent needed more than 1 credit. More details are shown in figure 1 and table 1.

**Credits earned by grades**

Figure 2 presents the average number of credits earned by 1982 high school graduates at the 9th through the 12th grades for all courses and for courses in the new basics. The number of credits in non-basics (shown by non-shaded areas) at each grade level was quite large. More than one-third of the completed courses in the 9th grade and about half of the completed courses in the 12th grade were non-basics.

Figure 2 also shows that students earned fewer credits in their last year of high school than in any other year. This decrease in number of credits verifies the popular notion that high school seniors generally take a lighter load of coursework ("the senior slump"). One explanation may be that many seniors have finished most of their requirements for graduation before their last year in high school.[4]

The number of credits in the new basics declined from 3.6 units in the 9th grade to 2.6 units in the 12th grade. (This trend would be expected if many students finished most of their requirements for graduation in early years of high school.) This decline is particularly evident in mathematics and science. As shown in Figure 3, the average number of credits earned in mathematics was 0.9 unit in the 9th grade, but only 0.4 unit in the 12th grade. Similarly, 0.7 unit in science was earned in the 9th grade but only 0.3 unit in the 12th grade. In contrast, the number of credits earned in English remained about the same over the 4 years; and the number of credits for social studies was higher in the last 2 years of high school than the first 2 years.

**Comparisons of coursework in the new basics among students with different backgrounds**

Students with different backgrounds proved to have different course-taking patterns, especially in the new basics. As shown in table 2, high SES students earned a total of 15 credits in the new basics as compared to 12 credits for low SES students over the 4 years of high school. Whites and Asian Americans earned more credits in these courses than did Hispanics and blacks (13 and 15 vs. 12 and 12 units, respectively); furthermore, academic program students earned more credits than did general and vocational/technical program students (15, 12, and 11 units, respectively).

Students in the New England and Middle Atlantic regions of the country earned about 1 to 2 more credits in the new basics than students in other regions, and private school students earned about 3 more credits in the new basics than did public school students.

The subgroup differences exist from the 9th through the 12th grade level (table 2 and figure 4). For example, in the 9th grade, the academic program students earned 4.0 credits in the new basics as compared to 3.3 credits for the general program students and 3.4 credits for the vocational/technical program students. The difference increased in the 12th grade: the academic program students earned 3.3 credits as compared to 2.3 credits for the general program students and 1.8 credits for the vocational/technical program students.

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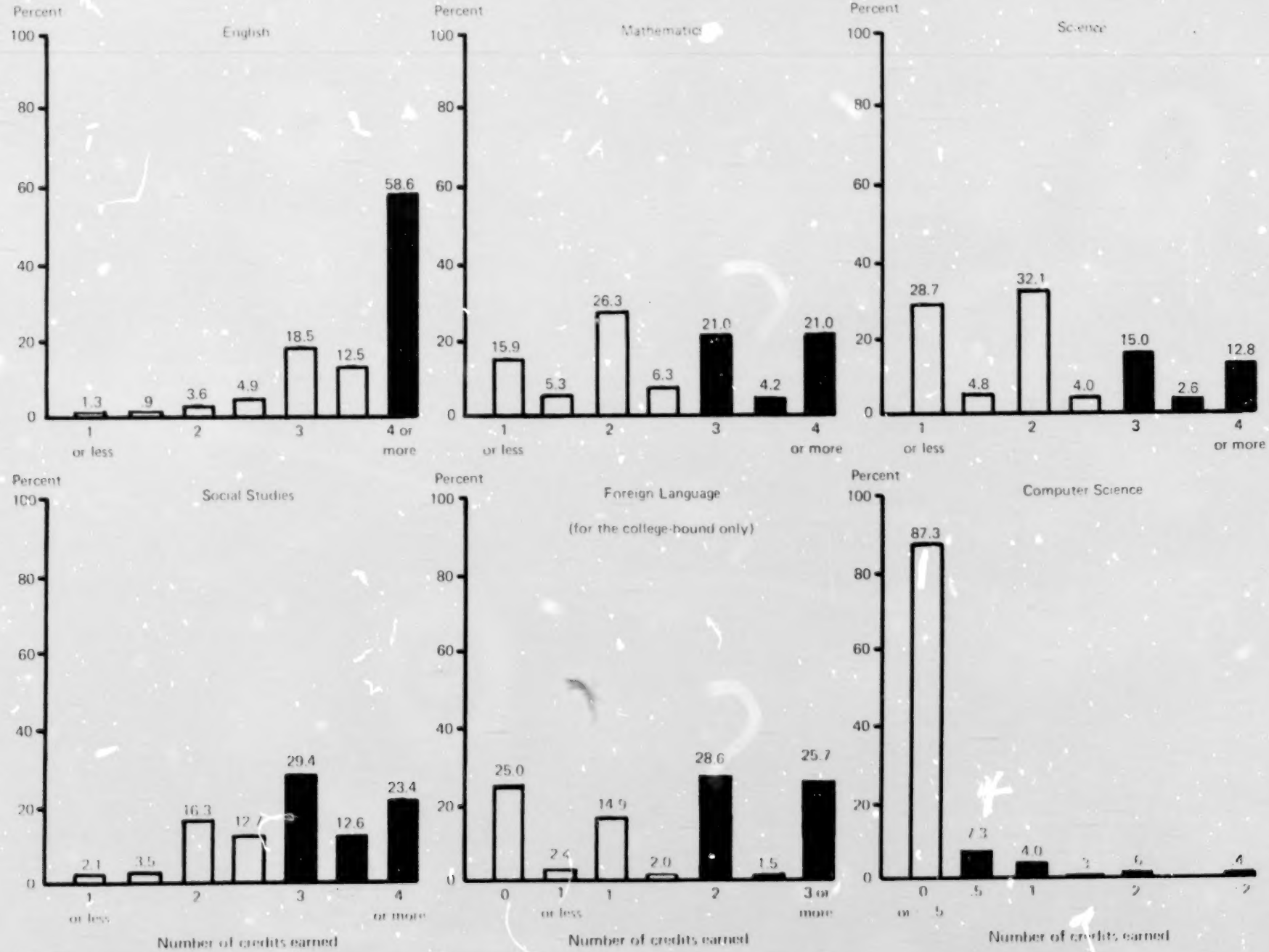
[3] "How Well do High School Graduates of Today meet the Curriculum Standards of the National Commission?" National Center for Education Statistics bulletin, NCES 83-233, September 1983.

[4] The average number of total credits required for graduation was 19.8. By subject area, the requirement was 3.6 credits for English, 1.7 credits for mathematics, 1.6 credits for science, 2.6 credits for history/social studies, and less than 0.1 for foreign language. See *School District Survey of Academic Requirements and Achievement*, National Center for Education Statistics bulletin, NCES 83-210, April 1983.

Figure 1. Percent of 1982 high school graduates earning varying numbers of credits for English, mathematics, science, social studies, foreign language, and computer science.




Indicates that the requirement recommended by the National Commission on Excellence in Education has been met or exceeded

Table 1. Percentages of 1982 high school graduates meeting or falling short of the recommended standards in the new basics.

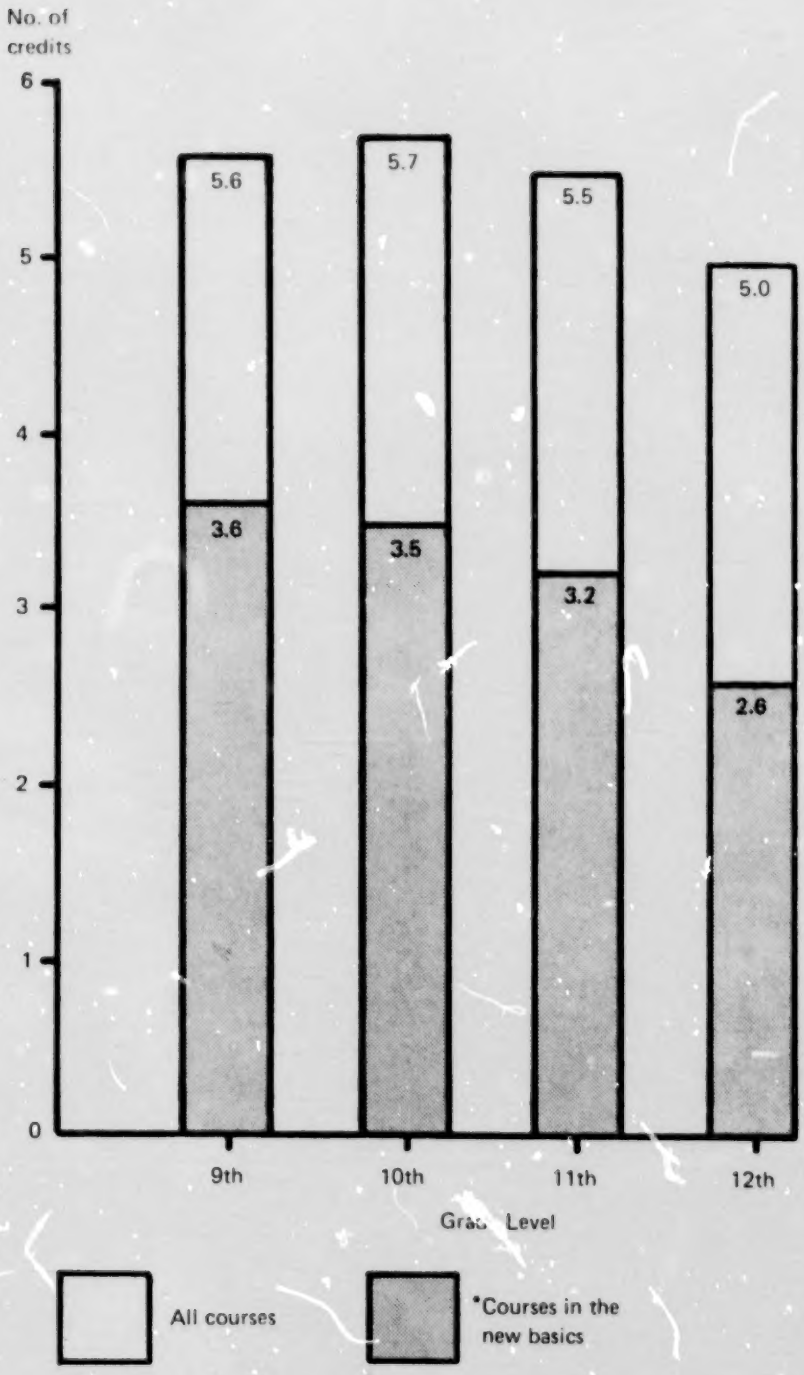
| Performance vs. Standard | English | Mathematics | Science | Social studies | Computer science | Foreign language[a] |
|---|---|---|---|---|---|---|
| | | | (in percent) | | | |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |
| Met or exceeded | 59 | 46 | 30 | 65 | 13 | 56 |
| Needed 1/2 unit more | 12 | 6 | 4 | 13 | 87 | 2 |
| Needed 1 unit more | 18 | 26 | 32 | 16 | b | 15 |
| Needed more than 1 unit | 11 | 21 | 34 | 6 | a | 27 |

[a] This standard applies only to college-bound students.

[b] Not applicable--standard is 1/2 unit.

Note.--Details may not add to totals because of rounding.

Figure 2. Average number of credits earned, by grade level.




*Courses in English, mathematics, science, social studies, foreign language, and computer science.



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Figure 3. Average number of credits earned by 1982 high school graduates for English, mathematics, science, social studies, foreign language, and computer science, by grade.

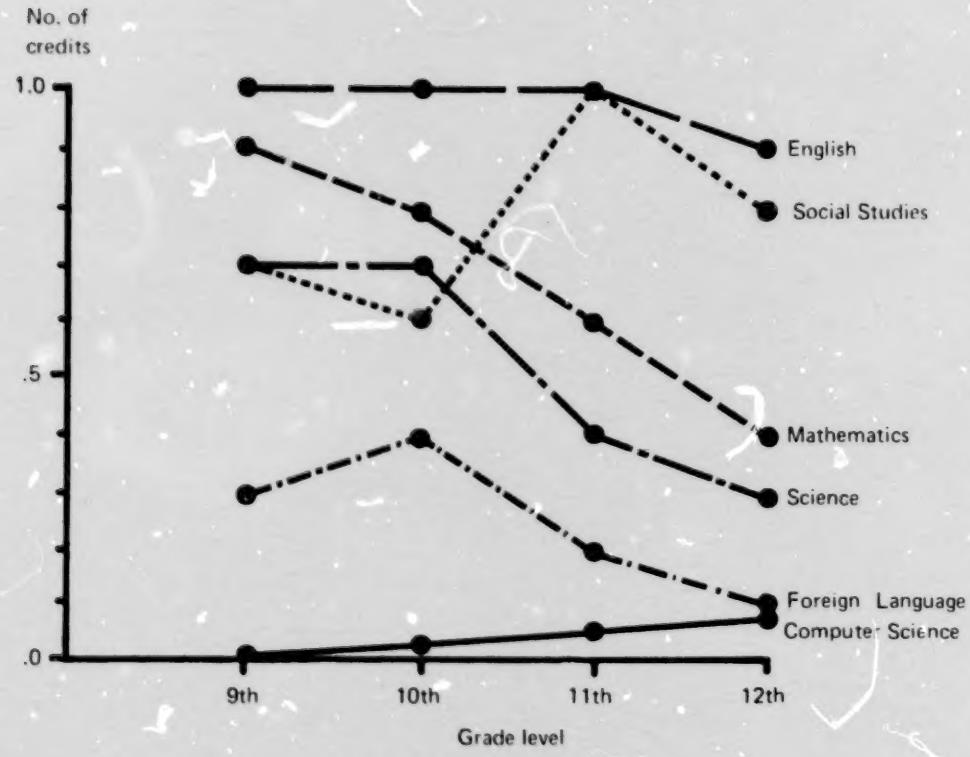
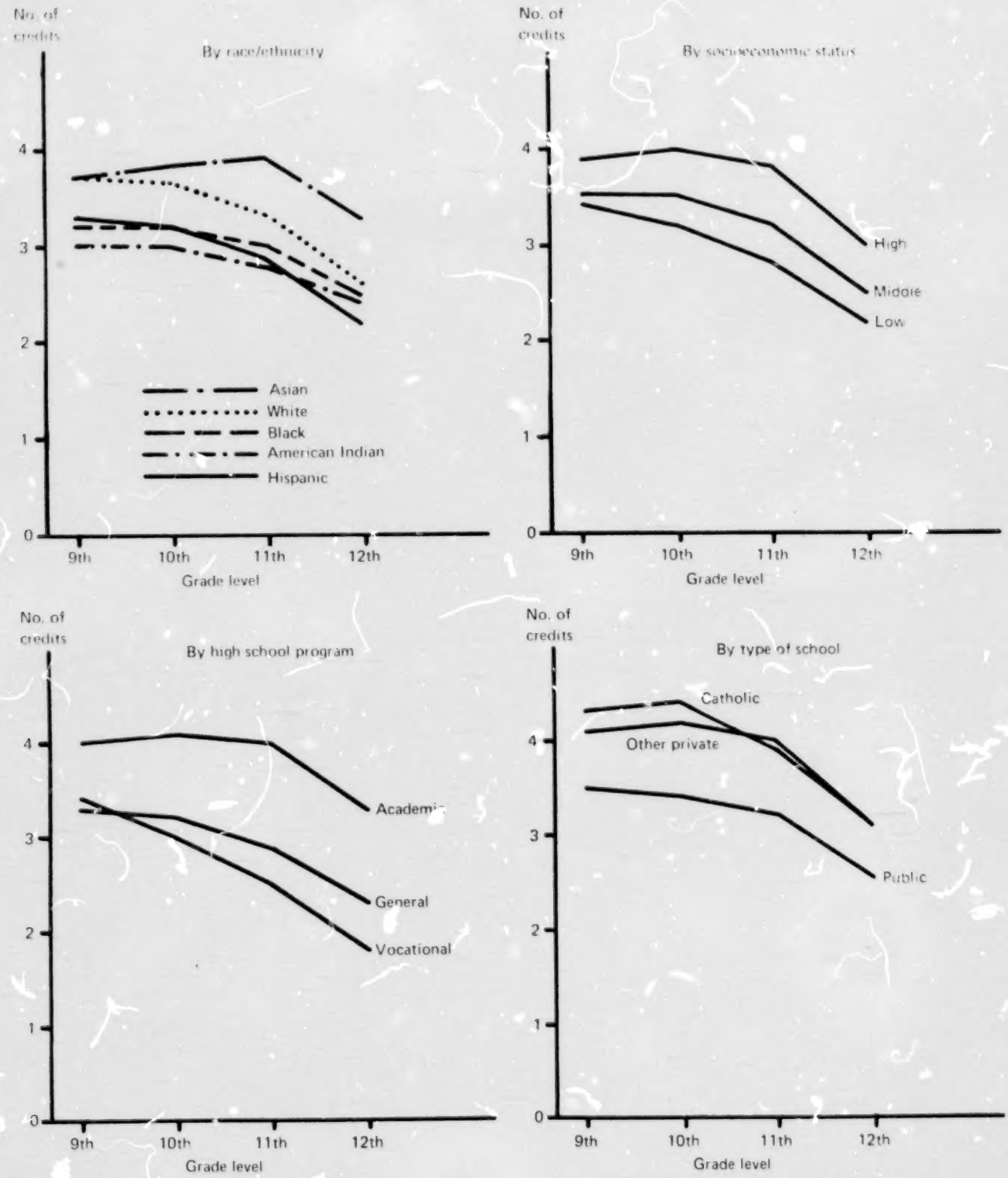


Table 2. Average number of credits earned in all subjects and in new basics for selected subgroups, by grade level.

| Subgroup | In all subjects | In new basics only | | | | |
|---|---|---|---|---|---|---|
| | | Total | Grade level | | | |
| | | | 9th | 10th | 11th | 12th |
| All students | 21.8 | 2.9 | 3.6 | 3.5 | 3.1 | 2.6 |
| Race/ethnicity | | | | | | |
| Black | 21.1 | 11.9 | 3.2 | 3.2 | 3.0 | 2.5 |
| Hispanic | 21.7 | 11.7 | 3.3 | 3.2 | 2.9 | 2.2 |
| Asian | 22.6 | 14.7 | 3.7 | 3.8 | 3.9 | 3.3 |
| American Indian | 21.3 | 11.2 | 3.0 | 3.0 | 2.8 | 2.4 |
| White | 21.9 | 13.2 | 3.7 | 3.6 | 3.3 | 2.6 |
| Socioeconomic status | | | | | | |
| High | 22.3 | 14.7 | 3.9 | 4.0 | 3.8 | 3.0 |
| Middle | 21.8 | 12.7 | 3.5 | 3.5 | 3.2 | 2.5 |
| Low | 21.3 | 11.5 | 3.4 | 3.2 | 2.8 | 2.2 |
| High school program | | | | | | |
| Academic | 22.5 | 15.3 | 4.0 | 4.1 | 4.0 | 3.3 |
| General | 21.3 | 11.7 | 3.3 | 3.2 | 2.9 | 2.3 |
| Vocational/technical | 21.4 | 10.7 | 3.4 | 3.0 | 2.5 | 1.8 |
| Type of school | | | | | | |
| Public | 21.5 | 12.5 | 3.5 | 3.4 | 3.2 | 2.5 |
| Catholic | 24.0 | 15.7 | 4.3 | 4.4 | 3.9 | 3.1 |
| Other private[a] | 21.1 | 15.3 | 4.1 | 4.2 | 4.0 | 3.1 |
| Region | | | | | | |
| New England | 20.8 | 13.3 | 3.9 | 3.9 | 3.7 | 2.8 |
| Middle Atlantic | 22.4 | 14.3 | 4.1 | 4.0 | 3.5 | 2.8 |
| South Atlantic | 21.2 | 12.8 | 3.4 | 3.6 | 3.3 | 2.6 |
| East South Central | 20.0 | 11.9 | 3.4 | 3.0 | 3.0 | 2.5 |
| West South Central | 22.8 | 12.9 | 4.0 | 3.7 | 2.8 | 2.3 |
| East North Central | 20.7 | 11.9 | 3.4 | 3.2 | 3.1 | 2.4 |
| West North Central | 23.7 | 13.2 | 3.6 | 3.6 | 3.3 | 2.7 |
| Mountain | 22.1 | 11.7 | 3.2 | 3.2 | 3.0 | 2.3 |
| Pacific | 22.6 | 12.5 | 3.4 | 3.2 | 3.3 | 2.6 |

[a] Estimates for this type of school may not be as accurate as those for other types of schools because of a small sample size and a high nonresponse rate.

Figure 4. Average number of credits earned by 1982 high school graduates in the new basics, by grade level and selected subgroups.



Subgroup difference in the new basics courses may reflect either the nature of the high school program, or the expectations of students, or other factors. Future analyses of HS&B data may provide additional information about this relationship between high school courses and educational attainment.

## Technical Notes

### Classification of courses

All courses in each transcript were assigned a 6-digit code based on *A Classification of Secondary School Courses* (CSSC), developed under contract with NCES, July 1982. The number of credits earned in each course was expressed in Carnegie units. (A Carnegie unit requires a minimum of 200 minutes for a regular class and 275 minutes for a lab class per week for 36 weeks. Some schools, however, may require more time for a credit.) Cognizant of the Commission's concerned that "we have a cafeteria-style curriculum in which appetizers and desserts can easily be mistaken for the main courses," this analysis used fairly conservative criteria in deciding whether the courses taken by the students were in fact the "New Basics." If a more liberal interpretation of course content had been made, other courses would have been included. For example, courses which were primarily vocational/technical were excluded, although portions of such courses might well contain material very similar to that found in basic courses.

### Sample size

HS&B base-year data were collected in 1980 from over 30,000 sophomores and 28,000 seniors in 1,015 public and private schools across the Nation. As part of the first follow-up survey, transcripts were requested in fall 1982 for a subsample of 18,152 members of the sophomore cohort. A total of 15,941 transcripts were actually obtained. The number of these that were complete and that indicated graduation in 1982 was 12,116, the number used in the analysis reported here.

### Standard errors and statistical significance testing

The approximate standard error of a percentage (p) in this paper can be obtained by $s.e.(p) = D\,[p\,(100 - p)\,/\,n]^{\frac{1}{2}}$, where n is the sample size and D is a correction factor estimated to be 2.0. The sample size is 12,116 for all students, and 5,449 for the college-bound.

Standard errors for entries in table 2 are presented in appendix A. They were computed using the Balanced Repeated Replicates method. Group differences cited in the text are statistically significant at the 0.05 level on the basis of two-tailed t tests.

### For more information

For more information about this *bulletin,* contact Mr. Samuel S. Peng, Jeffrey A. Owings, and William B. Fetters, Division of Multilevel Education Statistics, telephone (202) 254-7351.

For information about High School and Beyond, contact David A. Sweet, National Center for Education Statistics (Brown Building, Room 609), 400 Maryland Avenue SW., Washington, D.C. 20202, telephone (202) 254-7230.

## Appendix A

**Standard errors for entries in table 2.**

| Subgroup | In all subjects | In new basics only | | | | |
|---|---|---|---|---|---|---|
| | | Total | Grade level | | | |
| | | | 9th | 10th | 11th | 12th |
| All students | .11 | .08 | .04 | .03 | .03 | .02 |
| Race/ethnicity | | | | | | |
| Black | .19 | .20 | .08 | .06 | .05 | .08 |
| Hispanic | .15 | .12 | .06 | .07 | .03 | .03 |
| Asian | .22 | .19 | .10 | .06 | .09 | .10 |
| American Indian | .32 | .26 | .18 | .15 | .13 | .30 |
| White | .13 | .09 | .04 | .03 | .03 | .03 |
| Socioeconomic status | | | | | | |
| High | .17 | .11 | .06 | .06 | .03 | .04 |
| Middle | .17 | .10 | .04 | .04 | .03 | .03 |
| Low | .19 | .15 | .08 | .07 | .05 | .04 |
| High school program | | | | | | |
| Academic | .16 | .11 | .06 | .04 | .03 | .03 |
| General | .18 | .11 | .06 | .04 | .04 | .04 |
| Vocational/technical | .15 | .09 | .05 | .04 | .03 | .03 |
| Type of school | | | | | | |
| Public | .10 | .08 | .03 | .03 | .03 | .02 |
| Catholic | .76 | .35 | .12 | .12 | .09 | .06 |
| Other private[a] | 1.27 | .85 | .24 | .23 | .17 | .27 |
| Region | | | | | | |
| New England | .45 | .25 | .23 | .08 | .04 | .08 |
| Middle Atlantic | .13 | .21 | .06 | .06 | .07 | .07 |
| South Atlantic | .24 | .22 | .12 | .06 | .08 | .07 |
| East South Central | .44 | .20 | .14 | .06 | .07 | .07 |
| West South Central | .59 | .53 | .32 | .25 | .08 | .09 |
| East North Central | .28 | .15 | .05 | .05 | .04 | .05 |
| West North Central | .84 | .49 | .11 | .13 | .17 | .20 |
| Mountain | .41 | .16 | .04 | .06 | .05 | .09 |
| Pacific | .17 | .17 | .06 | .06 | .07 | .06 |

[a] Estimates for this type of school may not be as accurate as those for other types of schools because of a small sample size and a high nonresponse rate.